MSOE

MILWAUKEE SCHOOL OF ENGINEERING

BULLETIN

EVENING DIVISION CATALOG 1961-1962

AUDIO, RADIO, TELEVISION PROGRAM

Evening Division students in the MSOE TV and Communications Laboratory.

This program offers a well-balanced selection of subjects in audio, electronics, radio, and television areas. Each subject in the program has been planned carefully by the MSOE Industrial Advisory Committee to provide proper training in these fields.

The subjects in this series may be pursued individually to earn subject certificates. To receive an Industrial Technology certificate in audio, radio and television, a student must earn a minimum of 14 credits by satisfactorily completing the following subjects in this sequence:

EV-151 — Principles of Electricity .....3½ cr.
EV-101 — Radio Electronics .....3½ cr.
EV-111 — Television Principles .....3½ cr.

The remaining required credits may be earned by selecting one or more of these elective subjects:

EV-107 — Commercial Radio and Television License ..5 cr.
EV-113 — Advanced Television Principles .....1 cr.
EV-115 — Color Television .....2½ cr.
EV-121 — Ultra High Frequency Techniques .....2½ cr.
EV-129 — Audio Systems and Equipment .....2½ cr.
EV-136 — Semi-Conductor Fundamentals .....2 cr.
EV-137 — Transistor Applications .....2½ cr.
EV-138 — Transistor Equivalent Circuit Analysis .....2½ cr.

Credit earned in this program also is applicable toward an Associate in Applied Science degree from the MSOE Evening Division.

This program, with its elective specialties, provides the background necessary to progress in such occupational areas as:

Radio and Television Servicing — The installation, testing, adjustment, and repair of such equipment.

Electronic Equipment Servicing — The testing, installation, and maintenance of electronic equipment.

Radio, Television, and Electronic Equipment Testing — The testing of such equipment in a manufacturing plant.

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Sound Reproduction Equipment Servicing — The design, installation and repair of complete sound systems, including microphones, disc and tape playback circuitry.

Two-way Radio Equipment Maintenance — The installation and repair of such equipment; in most cases, an FCC license is required for the performance of these duties.

Electronic Equipment Merchandising — The buying, demonstrating and selling of such equipment; may include management of a service department and handling of technical correspondence.

High Frequency Equipment Maintenance — The testing and repair of such equipment; may include phases of manufacturing.

	Tuition For 18-Week Semester	Sessions Per Week	Hours Per Session	Credit in Semester Hours
EV-101 — Radio Electronics	**$100.00**	**2**	**2½**	**3½**

This subject acquaints the student with the basic principles of operation of electronic circuits and components used in audio, radio and television communication. A solid foundation in applied electronics is acquired through study of each circuit and component in a modern 5-tube superheterodyne receiver which the student constructs in the laboratory. This experience, in conjunction with the lecture sessions, qualifies the student for entry into the field of home and automobile radio servicing. Beginning with a review of d-c and a-c circuits, study progresses into basic vacuum tube theory, power supply systems, audio amplifiers, RF and IF amplifiers, converters, oscillators, resonant circuits, impedance matching, packaged electronic circuits, and solid-state devices used in receivers and amplifiers. The proper use of test equipment such as the oscilloscope, vacuum tube voltmeters, AF and RF signal generators and other related equipment is emphasized. (Prerequisite: EV-151 or equivalent background)

EV-107 — Commercial Radio and Television License	**$100.00**	**2**	**2½**	**5**

This subject prepares the student for a Federal Communications Commission first class license examination. Elements 1, 2, 3 and 4 of the FCC commercial license examination are covered in lecture and classroom discussions which present the technical information and methods necessary to solve examination problems and questions. Understanding of basic principles rather than memorization of data is emphasized. Among topics covered are international and U. S. communications regulations; basic operating practice; basic electrical theory; practical characteristics of motors, generators, and batteries; circuit theory, tuning procedures and diagrams of AM, FM and TV transmitters and receivers; and a demonstration of the tuning, operating and characteristics of a one-kilowatt AM transmitter. (Prerequisite: EV-101 or equivalent background)

EV-111 — Television Principles	**$100.00**	**2**	**2½**	**3½**

This is a study of television receivers isolated in individual stages. Lectures and classroom demonstrations present the theory and principles of operation for each individual stage. Laboratory sessions provide practice in determining the proper operation of each stage as a part of the complete receiver. Proper ad-

	Tuition For 18-Week Semester	Sessions Per Week	Hours Per Session	Credit in Semester Hours

justment, alignment procedures, and trouble-shooting techniques are incorporated. (Prerequisite: EV-101 or equivalent background; radio servicemen are qualified)

EV-113 — Advanced Television Principles $50.00 1 2½ 1

Special applications of television test equipment and advanced servicing techniques are studied in laboratory practice, lecture and demonstrations. Interpretation of manufacturers' alignment procedures including short cuts and special techniques, methods of alignment without manufacturers' data, and re-alignment to improve performance for fringe area reception are covered. Selection of proper servicing procedure to facilitate rapid location of defects is emphasized. Special servicing techniques for deflection circuits, synchronizing circuits, and video circuits, as well as servicing by signal substitution and signal tracing are included. (Prerequisite: EV-111 or equivalent background)

EV-115 — Color Television $50.00 1 2½ 2½

The fundamentals of color television transmitters and receivers are covered in this subject. Physics of color, along with such common color defining terms as hue, saturation and brightness, and the production of color with primary light sources, are given special attention. The evolution of the transmitted signal and compatibility of color reception to black and white are studied. Commercial color television receiver circuits, as well as installation and servicing procedures, are described in classroom lectures supplemented by laboratory demonstrations. (Prerequisite: EV-111 or equivalent background)

EV-121 — Ultra High Frequency Techniques $50.00 1 2½ 2½

This is a nonmathematical study of the characteristics and limitations of circuit components, circuits, and equipment used with frequencies in the VHF, UHF, and SHF bands. Basic concepts of resistance, capacitance, and inductance are covered. Major topics are UHF tuners, transmission lines, waveguides, cavity resonators, antennas, magnetrons, and klystrons, together with measuring equipment and measuring methods. This subject is not limited to television applications but is a general coverage of all VHF, UHF, and SHF principles, leading to a better understanding of equipment used in microwave relay links, television, radar, telemetering, FM radio, vehicular communication, and antenna installations. (Prerequisite: EV-111 or EV-160 or equivalent background)

EV-129 — Audio Systems and Equipment $50.00 1 2½ 2½

This study acquaints the student with audio problems, techniques and equipment. Present day technology is emphasized with demonstrations of professional and nonprofessional high-fidelity equipment. Topics include the decibel, sound and acoustics, loudspeakers and enclosures, microphones, amplifiers and measurements, disc and magnetic recording and reproduction, tuners and integrated systems. (Prerequisite: EV-101 or equivalent background)

	Tuition For 18-Week Semester	Sessions Per Week	Hours Per Session	Credit in Semester Hours
EV-136 — Semi-Conductor Fundamentals	**$40.00**	**1**	**2**	**2**

This introductory subject presents the principles of semi-conductor devices and transistors as background for subsequent study. Topics include the physics and chemistry necessary to understand semi-conductor action; P-N Junctions; the physical action of transistors; biasing; basic transistor amplifier circuits compared to their vacuum tube equivalents; a summary of various transistor types; transistor manufacturing methods; and characteristic curves for transistors. (Prerequisite: EV-101 or EV-160 or equivalent background)

EV-137 — Transistor Applications	**$50.00**	**1**	**2½**	**2½**

This subject presents a practical rather than an analytical approach to the use of transistors in electronic applications. It is designed to meet the needs of people involved with servicing all types of electronic equipment including television, radio, and computers. Technicians in industry required to maintain, test, or construct transistorized components will find the practical approach of immediate value to their jobs. Topics include an introduction to the use of transistor load lines; transistor identification; transistor servicing techniques; and use of transistors in practical radio and TV circuits. Experiments are performed on semi-conductor diode characteristics, transistor characteristics, various transistor measurements, basic transistor amplifiers, and other practical transistor circuits. (Prerequisite: EV-136 or equivalent background)

EV-138 — Transistor Equivalent Circuits Analysis	**$50.00**	**1**	**2½**	**2½**

This subject is a study of the theoretical and circuit analysis approach to transistor components. It is designed for people who find it necessary to make specifications and designs for transistorized circuits. Technicians and engineers will find this study of value because it will provide knowledge which will enable them to predict the action of unconventional as well as conventional circuits. Topics include transistor circuit load line analysis; review of d-c and a-c circuits; voltage and current sources; circuit analysis methods; Thevenin's and Norton's theorems; review of vacuum tube equivalent circuits; the transistor as a circuit element; h-parameters; small signal amplifiers; bias stability; direct current, power, and cascade amplifiers; and feedback. (Prerequisite: EV-136 or equivalent background)

EV-151 — Principles of Electricity	**$100.00**	**2**	**2½**	**3½**

This subject supplies a firm background in d-c and a-c fundamentals for subsequent work in any field of electricity. Topics include d-c circuits, work, power, and energy; batteries; switches and switching circuits; alternating current fundamentals; a-c circuit solutions; magnetism and induction; power factor calculations; transformers; and an introduction to three-phase circuits. The laboratory experiments are selected to demonstrate the principles covered in the lecture sessions. Emphasis is on the use of the ammeter, voltmeter, and wattmeter.

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EVENING DIVISION

SUPERVISORY AND
INDUSTRIAL MANAGEMENT
TRAINING PROGRAMS

SPECIAL COMPANY PROGRAMS

ASSOCIATE IN APPLIED SCIENCE AND
BACHELOR OF SCIENCE DEGREE PROGRAMS

SELECTED SUBJECTS

TECHNOLOGY PARK • MILWAUKEE 1, WISCONSIN